REMARKS

The present amendment is prepared in accordance with the new revised requirements of 37 C.F.R. § 1.121. A complete listing of all the claims in the application is shown above showing the status of each claim and the amendments to the specification are shown above in the replacement paragraphs. For current amendments, inserted material is underlined and deleted material has a line therethrough.

Applicants appreciate the thoroughness with which the Examiner has examined the above-identified application. Reconsideration is requested in view of the amendments above and the remarks below.

Claim 1 has been amended to clarify that which applicants regard as the invention. Support for amended claim 1 can be found in the specification in paragraphs [0039] to [0044] and in Figs. 5-7.

Claims 4, 6, 7, 8, 10, 11 and 18 have been amended to correct for antecedent basis errors.

No new matter has been added.

Objection to the Drawings

The Examiner has objected to the drawings under 37 CFR 1.84(p)(5) stating that they do not include reference sign 22" mentioned in the description, however, they do include the reference sign 22' which is not mentioned in the description.

Applicants have amended the specification at paragraphs [0031] to [0033] to correct for a typographical error. Namely, reference sign 22' as depicted in the drawings correctly represents a trench top oxide layer deposited within deep trenches 20. Originally

submitted paragraphs [0031] to [0033] contained a typographical error and incorrectly referred to such trench top oxide layer with reference sign 22", rather than the correct reference sign 22' depicted in the drawings. Accordingly, paragraphs [0031] to [0033] have been amended to clarify that the trench top oxide layer is represented by reference sign 22' depicted in the drawings.

The Examiner has also objected to the drawings under 37 CFR 1.84(p)(5) as including the reference sign 20b which was not mentioned in the description. Applicants have amended paragraphs [0031] and [0033] to correct for a clerical error by clarifying that the lower portion of the trench is represented by reference sign 20b, while the upper portion of the trench is represented by reference sign 20a.

It is respectfully submitted that applicants have amended the specification in accordance with MPEP § 2163.06 by including information contained in the originally filed drawings to make the specification conform to the drawings. Applicants submit that the above amendments to the specification overcome the Examiner's objections to the drawings, such that the objection to the drawings under 37 CFR 1.84(p)(5) is now moot.

No new matter has been added.

Claim Rejections Under 35 USC 112

The Examiner has rejected claims 4-8, 10-12, and 18-20 have been rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject mater which Applicants regard as the invention.

Applicants submit the above amendments to claims 4, 6, 7, 8, 10, 11 and 18 clarify the invention by correcting for antecedent basis errors. Applicants have not amended

claim 12, which is dependent upon claim 11, which in turn, is dependent from claim 10. In claim 10, at line 3, the limitation "first mask" is recited such that the limitation of "said first mask" in line 1 of claim 12 has sufficient antecedent basis.

It is respectfully submitted that amended claims 4, 6, 7, 8, 10, 11 and 18 overcome the 35 USC 112, second paragraph, rejections set forth in the above-identified office action.

No new matter has been added.

Allowable Subject Matter

Claims 9-20

Applicants appreciate the allowance of claims 9 and 13-17.

The Examiner indicated that claim 18 would allowable if rewritten or amended to overcome the rejections under 35 USC 112, second paragraph, set forth in the above-identified office action. Applicants submit that amended claim 18 overcomes such rejections under 35 USC 112, second paragraph, and as such is now in a condition for allowance.

The Examiner has also indicated that claims 10-12, 19 and 20 would be allowable if rewritten to overcome the rejections under 35 USC 112, second paragraph, set forth in the above-identified office action, and to include all of the limitations of the base claim and any intervening claims.

Accordingly, applicants have amended claims10-12, 19 and 20 such that they overcome the second paragraph rejections under 35 USC 112. Since claims10-12 are

dependent upon allowed claim 9, applicants submit that claims10-12 are also in a condition for allowance. With respect to claims 19 and 20, these claims are dependent upon amended claim 18, which is now believed to be in a condition for allowance. As such, applicants submit that claims 19 and 20 are also in a condition for allowance.

No new matter has been added.

Rejections under 35 USC 102

The Examiner has rejected claims 1 and 8 under 35 USC 102(a) as being anticipated by Radens et al. (U.S. Patent No. 6,426,252). Applicants disagree.

As amended, claim 1 clarifies that the present invention is directed to a method of providing an array top oxide over an array of trenches containing trench capacitors and overlying vertical transistors. The method includes providing a substrate having a first area and a second area and then providing a sacrificial oxide layer over such areas. The sacrificial oxide layer is removed only from the second area and then a gate oxide layer is provided over the second area, followed by depositing a gate conductor layer over the first and second areas. The gate conductor layer is removed only from the first area, and then an array top oxide is deposited over the first and second area. Subsequently, the array top oxide layer is removed from the second area so as to leave remaining portions of array top oxide only in the first area.

Applicant submits that the present invention is not anticipated by Radens et al. Anticipation is but the ultimate or epitome of obviousness. To constitute anticipation, all material elements of a claim must be found in one prior art source. In re Marshall, 577 F.2d 301, 198 USPQ 344 (CCPA 1978).

Applicants submit that Radens et al. discloses opening deep trenches 120 through an SOI layer 124, BOX layer 122 and into a substrate 126 using a conventional photolithography technique to pattern a hard mask layer and then etching the trenches using an anisotropic dry etch technique. (Col. 4, line 59 to col. 5, line 2.) However, prior to doing so, Radens et al. discloses that a layered semiconductor wafer is first prepared by forming a buried oxide (BOX) layer 122 on a substrate 126 to isolate the substrate 126 from a silicon layer (SOI layer) 124 that is above the BOX layer. (Col. 3, line 66 to col. 4, line 7, and Fig. 1.) Then in step 102 of Radens et al., deep trenches are formed through the silicon layer 124, the BOX layer 122 and into the thicker substrate 126. (Col. 4, lines 7-11.)

With reference to Fig. 2A, Radens et al. discloses that the starting wafer is prepared by forming BOX layer 122 over silicon substrate 126 to separated substrate 126 from the SOI silicon layer 124. (Col. 4, lines 30-49.) The preferred DRAM cell formation continues by forming a pad layer 128 of an insulating material such as silicon nitride (SiN) on the upper surface 130 of silicon layer 124. (Col. 4, lines 50-52.) Radens then discloses having prepared the wafer in step 100, deep trenches 120 are then opened through the SOI layer 124, BOX layer 122 and into the substrate 126 in step 102 using conventional photolithography to pattern a hard mask layer and then etching the trenches using an anisotropic dry etch technique. (Col. 4, line 59 to col. 5, line 2.)

In the above office action, the Examiner takes the position that the present invention is anticipated by Radens et al., stating that Radens discloses providing a substrate 126 having a first area and a second area (Fig. 2A), providing a sacrificial oxide layer 122 over the first and second areas (Fig. 2A) and then removing the sacrificial oxide layer only from

the second area (Fig. 2A). In view of the above, it is applicant's understanding that the Examiner is likening Radens' wafer comprising SOI layer 124, BOX layer 122 and substrate 126 to applicant's claimed first area and Radens' deep trenches 120 to applicant's claimed second area. Applicants respectfully disagree with the Examiner's rejection over Radens et al.

In accordance with Radens et al., the wafer (i.e., the first area) is formed in step 100 by providing the BOX layer 122 over the silicon substrate 126 to separate such substrate 126 from the SOI silicon layer 124. Once the wafer (first area) is formed, the deep trenches (i.e., the second area) are then opened through the SOI layer 124, BOX layer 122 and into the substrate 126 in step 102. Hence, applicants submit that Radens et al. is limited to the substrate 126 having a first area comprising remaining portions of SOI layer 124, BOX layer 122 (sacrificial oxide layer) and substrate 126, and a second area comprising the deep trenches, as shown in Fig. 2A.

Applicants' invention as recited in claims 1-8 includes providing a substrate having a first area and a second area, and then providing a sacrificial oxide layer over the first and second areas. On the contrary, Radens et al. does not disclose providing a sacrificial oxide layer (BOX layer 122) over the second area (i.e., deep trenches 120) as is currently claimed. Rather, the BOX layer 122 is removed from the wafer in step 100 to form the second area comprising the deep trenches in step 102.

Accordingly, applicants submit that claims 1-8 of the present invention include limitations not disclosed nor contemplated by Radens et al. such that Radens et al. does not anticipate nor render obvious the instant invention.

It is respectfully submitted that the application has now been brought into a condition where allowance of the case is proper. Reconsideration and issuance of a Notice of Allowance are respectfully solicited. Should the Examiner not find the claims to be allowable, Applicants' attorney respectfully requests that the Examiner call the undersigned to clarify any issue and/or to place the case in condition for allowance.

Respectfully submitted,

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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service on the date indicated below as first class mail in an envelope addressed to Mail Stop NON-FEE AMENDMENT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Name: Carol M. Thomas Date: February 25, 2004 Signature:

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